FINAL

Environmental Assessment

Modification and Operation of Building 103 at Michoud Assembly Facility (MAF) in Support of Ares Upper Stage Tooling and Welding, Constellation Program

National Aeronautics and Space Administration

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Marshall Space Flight Center
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ENVIRONMENTAL ASSESSMENT

MODIFICATION AND OPERATION OF BUILDING 103 AT MICHOUD ASSEMBLY FACILITY (MAF) IN SUPPORT OF ARES UPPER STAGE TOOLING AND WELDING, CONSTELLATION PROGRAM

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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Environmental Assessment Organization

This Environmental Assessment (EA) addresses the National Aeronautics and Space Administration's (NASA's) Proposed Action to modify Building 103 by adding a High Bay approximately 100 x 140 x 150 feet (ft) (30.5 x 42.7 x 45.7 meters [m]) for the expressed purpose of housing two stations for vertical assembly welding, two stations for vertical barrel welding, and one station for vertical stacking for the Upper Stage of Ares I launch vehicle at the Michoud Assembly Facility (MAF), New Orleans, Louisiana. In addition to the expansion, MAF will also make several minor modifications to Building 103, to provide for Common Bulkhead Assembly and Bonding Facility, Robotic Weld Tool-1, 2, 3 Facility, Machine Center Facility, Common Bulkhead Clean Line, Avionics Integration, Test & Assembly, and Modifications for Reaction Control System Assembly.

As required by 32 Code of Federal Regulations (CFR) 651 and the National Environmental Policy Act (NEPA of 1969), the potential effects of implementing this action were analyzed.

The ***EXECUTIVE SUMMARY*** provides a summary of the Proposed Action, alternatives to the Proposed Action, and conclusions of the EA.

A ***LIST OF ACRONYMS*** is provided immediately following the Table of Contents.

SECTION 1: PURPOSE OF AND NEED FOR THE PROPOSED ACTION provides an introduction and background, summarizes the purpose of and need for the Proposed Action, discusses the scope of the document, and identifies the resources considered but eliminated from further analysis.

SECTION 2: DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES describes the Proposed Action and the alternatives to the Proposed Action.

SECTION 3: AFFECTED ENVIRONMENT describes the existing conditions of each resource for which the Proposed Action and alternatives to the Proposed Action are evaluated.

SECTION 4: ENVIRONMENTAL CONSEQUENCES presents the potential effects of implementing the Proposed Action and alternatives to the Proposed Action on the resources described in Section 3, as well as mitigation measures.

SECTION 5: SUMMARY OF ENVIRONEMENTAL CONSEQUENCES AND CONCLUSIONS presents a tabulated summary of the potential consequences of the Proposed Action and No-Action Alternative and also presents the conclusions of the EA.

SECTION 6: REFERENCES presents bibliographical information about the sources used to prepare the EA.

SECTION 7: LIST OF PREPARERS provides information about the persons who prepared the EA.

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ACRONYMS

ACHP	Advisory Council on Historic Preservation
AOC	Areas of Concern
AST	Aboveground Storage Tank
bgs	Below ground surface
BMPs	Best Management Practices
CAA	Clean Air Act
CaLV	Cargo Launch Vehicle (also known as Ares V)
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEV	Crew Exploration Vehicle (also known as Orion)
CFC	chlorofluorocarbons
CFR	Code of Federal Regulations
CLV	Crew Launch Vehicle (also known as Ares I)
cm	centimeter
CO	carbon monoxide
COC	Constituents of Concern
dBA	decibels on the A-weighted scale
DMR	Discharge Monitoring Report
DNL	Day-Night Average A-Weighted Sound Level
EA	Environmental Assessment
EEOH	Environmental Engineering and Occupational Health
EDR/DM	Electrodyalisis Reversal /Demineralizer
EIS	Environmental Impact Statement
ENT	Entergy Investor Relations
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESC	Environmental Support Contractor
ET	External Tank
FICUN	Federal Interagency Committee on Urban Noise
FRP	Facility Response Plan
ft	foot
ft^2	square foot
GIWW	Gulf Intracoastal Water Way
GNOCDC	Greater New Orleans Community Data Center
gal	gallon
gpm	gallons per Minute
ha	hectare
HCFC	hydrochlorofluorocarbons
HVAC	Heating Ventilation and Air Conditioning
HWSF	Hazardous Waste Storage Facility
ISS	International Space Station
IWTF	Industrial Wastewater Treatment Facility
JSC	Johnson Space Center
kg	kilogram
km	kilometer
km^2	square kilometer
KSC	Kennedy Space Center
kV	Kilovolt

L/d	Liters per day
L/min	Liters per minute
LAC	Louisiana Administrative Code
LBP	Lead-based Paint
lbs	pounds
LDEQ	Louisiana Department of Environmental Quality
LH2	Liquid Hydrogen
LMSS	Lockheed Martin Space Systems
LO2	Liquid Oxygen
LPDES	Louisiana Pollutant Discharge Elimination System
m	meter
m^2	square meter
MAF	Michoud Assembly Facility
MGPD	million gallons per day
mg/L	milligrams per liter
mg/m^3	micrograms per cubic meter
mi	mile
mi^2	square mile
MSFC	Marshall Space Flight Center
msl	mean sea level
MVA	MegaVolt Ampere
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO2	Nitrogen Dioxide
NOx	Nitrogen Oxide
NOPSI	New Orleans Public Service Inc.
NPL	National Priorities List
NRHP	National Register of Historic Places
NPR	NASA Procedural Requirements
OPA	Oil Pollution Act of 1990
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PEIS	Programmatic Environmental Impact Statement
P.L.	Public Law
PM	Particulate Matter
$PM_{2.5}$	Particulate matter of 2.5 microns or smaller
PM_{10}	Particulate matter of 10 microns or smaller
ppm	parts per million
psig	Pounds per square inch gauge
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RQ	Reportable Quantity
SWBNO	Sewerage and Water Board of New Orleans
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SLA	Superlight Ablator
SPCC	Spill Prevention Control and Countermeasure
SSP	Space Shuttle Program
SWMU	Solid Waste Management Unit

SWP3	Storm Water Pollution Prevention Plan
TOMP	Toxic Organic Management Plan
TSDF	Treatment, Storage, and Disposal Facility
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
UST	Underground Storage Tank
VOC	Volatile Organic Compound
yrd^3	cubic yard
$\mu g/m^3$	micrograms per cubic meter
µmhos/cm	microhos per centimeter

Executive Summary

Introduction

The Michoud Assembly Facility (MAF) is managed by the National Aeronautics and Space Administration (NASA) Marshall Space Flight Center (MSFC), located in Huntsville, Alabama. The primary reference used in the preparation of this Environmental Assessment (EA) is the Environmental Resources Document, Michoud Assembly Facility, New Orleans, Louisiana, dated September 2006 and prepared by Dr. Marty Rowland, Facilities and Environmental Operations, Lockheed Martin Space Systems (LMSS) Company, Michoud Operations (LMSS 2006).

NASA proposes to modify Building 103 by constructing a High Bay addition that would measure approximately 100 x 140 x 150 feet (ft) (30.5 x 42.7 x 45.7 meters [m]) and operate two vertical assembly welding stations, two vertical barrel welding stations and one vertical stacking station, which would support the Upper Stage of Ares I Program at MAF which is located about 16 miles (mi) (25.7 kilometers [km]) east of downtown New Orleans, Louisiana. In addition to the expansion, MAF will also make six minor modifications to Building 103, including Common Bulkhead Assembly and Bonding Facility, Robotic Weld Tool-1, 2, 3 Facility, Machine Center Facility, Common Bulkhead Clean Line, Avionics Integration, Test & Assembly, and Modifications for Reaction Control System Assembly.

The Ares Program is an integral component of the much larger NASA Constellation Program. In compliance with National Environmental Policy Act (NEPA), NASA prepared the Constellation Programmatic Environmental Impact Statement (PEIS) to address impacts associated with the proposed Constellation Program (NASA 2008a). The Constellation PEIS concluded with a Record of Decision that was fully executed on February 28, 2008 (NASA 2008b). As such, this EA addresses potential impacts from expansion and modification of Building 103 and is tiered to the PEIS in accordance with NASA and Council on Environmental Policy Rules and Regulations. The Constellation Program is proposed to succeed the Space Shuttle Program which would be phased out by 2010 as per the Constellation PEIS. The Ares I launch vehicle consists of two primary elements: a solid fueled First Stage Booster and a liquid fueled Upper Stage. The Ares I will carry to orbit the astronaut crew in the Orion spacecraft, also known as the Crew Exploration Vehicle (CEV).

This EA has been prepared in compliance with the NEPA of 1969, as amended (42 United States Code [U.S.C.] 4321 et sequentes), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500 through 1508), and NASA regulations (14 CFR Part 1216 Subpart 1216.3). The outline and content of the EA are consistent with NASA Procedural Requirements (NPR) 8580.1 for implementing NEPA and Executive Order (EO) 12114 (NASA 2001).

Proposed Action

MAF is an 832.5-acre (333-hectare [ha]) site located in southeastern Louisiana, 16 mi (25.7 km) east of downtown New Orleans (see Figure 1-1). The facility is within the boundaries of Orleans Parish in the eastern section of metropolitan New Orleans. The city and parish boundaries are identical. The MAF is bounded by the Gulf Intracoastal Waterway (GIWW) to the south, the Michoud Canal to the east, Old Gentilly Road to the north, and the Entergy, Inc. commercial electricity generating facility and the New Orleans Fire Training Academy to the west. Located

about 100 mi (161 km) above the mouth of the Mississippi River, the MAF is sited at latitude N30º1'30" and longitude W89º54'54" (LMSS 2006).

The 14,000 square-foot (ft^2) (~1,300 square-meter [m^2]) High Bay expansion to existing Building 103 would contain three discrete areas for tooling and welding in support of the upper stage of the Ares I Program vehicle.

Alternatives to the Proposed Action

During preliminary planning, NASA evaluated constructing a new 14,000-ft^2 (~1,300-m^2) building at other locations under NASA control to support the Constellation Program. However, MAF is the only facility used by NASA that had the existing room and facilities to accommodate a High Bay expansion (NASA 2008a). Therefore, the modification of a different facility was not evaluated as a potential alternative to the Proposed Action. Similarly, the modifications to the existing facilities within Building 103 were the only alternatives considered other than no action. Existing high bay facilities within Building 103 were not available due to prior commitments to other NASA projects.

Based on the general infrastructure construction, planning, design, and environmental permitting that would be required, the cost of constructing a new, stand alone High Bay Building at any site would be significantly more than the cost of modifying Building 103. In addition to the considerable cost, constructing a new High Bay at the MSFC or at any other NASA center would be complicated by space and environmental requirements. In general, new construction also has a greater potential for environmental impacts than expanding the existing infrastructure. The availability of Building 103, its expansion area, and its suitability to be modified were considered a significant advantage over the alternative of constructing a new High Bay at another location. In addition, there are significant programmatic and environmental reasons for constructing the High Bay at MAF as opposed to other locations including:

- Complete manufacturing can occur at MAF saving cost and risk of damage during transportation;
- Less energy will be used for manufacturing due to being able to move Ares I from an attached High Bay into Building 103 for further assembly work instead of transporting by barge to MAF; and
- Alternative sites may have required substantial infrastructure modifications to support the transportation of stages (waterways, roads, etc.).

For these reasons, the potential alternative of constructing a new High Bay Building was rejected as a reasonable alternative to the Proposed Action of modifying and operating an expansion at Building 103.

The No-Action Alternative would be to maintain existing conditions. This would mean that the six minor modifications to Building 103 (Common Bulkhead Assembly and Bonding Facility, Robotic Weld Tool-1, 2, 3 Facility, Machine Center Facility, Common Bulkhead Clean Line, Avionics Integration, Test & Assembly, and Modifications for Reaction Control System Assembly) would not take place. In addition, there would be no construction and operation of an expansion at Building 103 for the Constellation Program. Under the No-Action Alternative, the Ares I Program would be adversely impacted by delays and added costs and would probably need to use less efficient and technically effective manufacturing methods such as horizontal welding.

Map Source: Environmental Resource Management, 28 July 2008.

0 1,000 2,000 Feet

FIGURE 1. Site Overview
Michoud Assembly Facility

NASA
New Orleans, Louisiana

Affected Environment

This EA assessed the potential impacts associated with the facility modifications within Building 103, and construction and operation of a High Bay addition to the existing Building 103 at MAF. The following resources that were evaluated include: land use, air quality, noise, topography, geology, soils, water resources, biological resources, cultural resources, socioeconomic resources, environmental justice, protection of children, infrastructure, and hazardous/toxic materials and wastes. Baseline conditions for these resources are described in Section 3 of this EA.

Environmental Consequences

The potential impacts that the Proposed Action would have on air quality and noise would be short-term and temporary, and are expected to be minor. Based on the type and condition of the habitat at and around Building 103, the Proposed Action would have a minimal impact on wildlife.

Archaeological surveys were conducted at or near MAF in 1981 and 1999. Two potential archaeological sites were identified on MAF property. These include a sugar house from the 19th century Michoud Plantation and a World War II-era brick building. Neither of these sites were determined to be National Register of Historic Places (NRHP) eligible. There are no known archaeological resources on MAF that are listed or eligible for listing in the NRHP (NASA 2008a).

The facility-wide historic buildings survey conducted in 1999 resulted in two resources (Building 110 and Building 420), being identified as eligible for the NRHP under Criteria A and C. These two buildings were related to the Apollo Manned Lunar Landing Program. See Figure 2-2 for the location of these Buildings.

A historical survey was conducted in 2007 to determine structures eligible due to their significant contribution to the SSP. The survey of 2007 added buildings 114, 451, and 452 as eligible for listing in the NRHP. Furthermore, the Louisiana State Historic Preservation Office (SHPO) requested additional information on Building 103. This SHPO request is currently under review by NASA but at this time, Building 103 and 68 major tools within the building, remain ineligible. Proposed modifications would not affect the historic integrity of Building 103 and, therefore, SHPO's review of the additional information requested would not be required to proceed with this project.

Under the Proposed Action, modification and operation of the Building 103 addition would not require permanent personnel relocations or employee hires. Expenditures for construction-related materials and supplies would have a small, short term, beneficial effect on the economy of the region. Operation of the High Bay attached to Building 103 would increase energy consumption at MAF; however, the increase in energy demand would not overburden the energy utility system of the Facility. Modification of Building 103 would temporarily increase traffic in the area during construction. The projected increase is not expected to significantly burden the road system at or around MAF.

Building 103 may contain lead-based paint (LBP). Management of LBP would be conducted by the MAF Environmental Engineering and Occupational Health (EEOH) Office during modification and expansion of Building 103 in accordance with all applicable federal, state, local, and NASA regulations and policies. Workers on the High Bay addition and 103 modifications would follow Occupational Safety and Health Administration (OSHA) standards and procedures and the project safety representative would ensure that LBP safety measures were implemented.

The Proposed Action would have little potential to interact with any past, present, or reasonably foreseeable future actions at or outside MAF. The coupling of the Proposed Action with the planned development projects identified in the MAF Master Plan is not expected to result in adverse cumulative impacts to any resource based on their locations, schedules, and respectively low direct/indirect impact potentials. The Proposed Action would allow MAF to support Ares Upper Stage tooling, welding and vertical stacking for the Constellation Program, and provide a critical High Bay addition to Building 103. Because of this, the Proposed Action would have positive cumulative impacts on operations at MAF and the mission of NASA.

Under the No-Action Alternative, MAF would support the Ares portion of the Constellation Program using less effective manufacturing methods which would increase scrap production costs while increasing technical risk to the upper stage. Therefore, the No-Action Alternative would negatively impact operations at MAF and the mission of NASA.

Conclusions

Based on the findings of this EA, the Proposed Action would not have a significant impact on the quality of the human or natural environment. Considering that the area has been used for heavy manufacturing for over 60 years, few environmental resources remain unaffected by industrial activities and the Proposed Action would not further degrade the condition of remaining resources. Therefore, no mitigation measures have been determined necessary for the Proposed Action. As such, this EA supports a Finding of No Significant Impact for the Proposed Action. Accordingly, preparation of a Supplement to the Constellation PEIS is not required.

1.0 Purpose of and Need for Proposed Action

1.1 Introduction

National Aeronautics and Space Administration (NASA) proposes to modify approximately six facilities within Building 103, and construct and operate a High Bay addition to Building 103 at Michoud Assembly Facility (MAF) in New Orleans, Louisiana. This construction effort will support the Ares I Upper Stage tooling, welding, and stacking for the Constellation Program. The High Bay will be used to assemble a launch vehicle that is vital to the overall mission of NASA.

This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] 4321 *et sequentes*), the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of NEPA (40 *Code of Federal Regulations* [CFR] Parts 1500 through 1508), and NASA regulations (14 CFR Part 1216 Subpart 1216.3). The outline and content of the EA are consistent with NASA Procedural Requirements (NPR) 8580.1 for implementing NEPA and Executive Order (EO) 12114.

1.2 Background

NASA has embarked on a program for exploration of the Moon, Mars and beyond (NASA, 2004). The completion of the International Space Station (ISS) and retirement of the Space Shuttle fleet by 2010 necessitate an innovative plan and program to fulfill the goals of human space exploration as established by the President and expressly endorsed by Congress in the NASA Authorization Act of 2005 (Public Law [P. L.] 109-155). NASA's Constellation Program will include a family of new spacecraft, launchers and associated hardware. The program will meet Presidential and Congressional directives and facilitate a variety of human and robotic missions, from International Space Station (ISS) re-supply to lunar and planetary landings. In compliance with the NEPA, NASA prepared the Constellation Programmatic Environmental Impact Statement (PEIS) to address impacts associated with the Constellation Program (NASA 2008a). The PEIS concluded with a Record of Decision (NASA 2008b) that was fully executed on February 28, 2008. As such, this EA addresses potential impacts from expansion and modification of Building 103 and is tiered to the PEIS in accordance with NASA and Council on Environmental Policy Rules and Regulations.

Constellation will use the Ares I launch vehicle and Orion spacecraft as the new crew transportation system. Ares I consists of a first stage solid rocket motor derived from the Space Shuttle and a new upper stage.

1.3 Purpose and Need

MAF is an 832-acre (333-hectare [ha]) site owned by NASA and located in eastern New Orleans. The facility has been a government-owned, contractor-operated component of Marshall Space Flight Center (MSFC) since its acquisition by NASA in 1961. Historically, MAF has been utilized for ship and cargo plane manufacturing during World War II, tank engine manufacturing during the Korean War, and by NASA for assembly of the first stages of the Saturn IV and Saturn V launch vehicles (Apollo Manned Lunar Landing Program in 1961), and manufacturing of the External Tank (ET) for the Space Shuttle Program (SSP) (in 1973). MAF's mission has been to support the continuing development and operations of NASA's SSP, and the primary product from the facility has been the design and assembly of the ET for the Space Shuttle. Currently, the SSP is scheduled to be retired and replaced by NASA's Constellation Program. Therefore, MAF

will be utilized for production of components for the Constellation Program, including the Orion crew exploration vehicle (CEV) (assigned to MAF but managed from Johnson Space Center [JSC]) and the Ares I Upper Stage and Ares V Core Stage and Earth Departure Stage (planned for production at MAF but managed from MSFC).

The proposed addition to Building 103 includes a High Bay measuring approximately 100 x 140 x 150 feet (ft) (30.5 x 42.7 x 45.7 meters [m]) and totaling 14,000 square feet (ft^2) (1,300.6 square meters [m^2]). This addition would provide tooling, welding and stacking stations to support the Ares I upper stage segment of the Constellation Program. Additional minor modifications to Building 103 will be required and these additions include a Common Bulkhead Assembly and Bonding Facility, Robotic Weld Tool -1, 2, 3 Facility, Machine Center Facility, Common Bulkhead Clean Line, and an Avionics Integration, Test & Assembly. Modifications for a Reaction Control System Assembly would also support requirements necessary for the development and production of the upper stage.

1.4 Scope of EA

This EA assesses the potential environmental, cultural, physical, and socioeconomic impacts associated with modifications to the existing Building 103 and construction and operation of a High Bay expansion at Building 103 in support of Ares I for the Constellation Program. Potential impacts associated with the Proposed Action are evaluated against those associated with the No-Action Alternative of maintaining existing conditions (i.e., not to modify the six facilities within Building 103 and operate a High Bay at Building 103 for the Constellation Program).

The Proposed Action analyzed in this EA pertains only to upgrading stations within Building 103 and expanding Building 103 by constructing a facility to weld, tool and stack components of the Ares I upper stage. The Ares V, which will be developed later for the Constellation Program, may require additional modifications to Building 103. Therefore, separate NEPA documentation may be necessary for the Ares V vehicle. Ongoing general maintenance work, including routine repairs and painting at Building 103, is not included in the Proposed Action addressed by this EA.

This EA tiers off of the Final Constellation PEIS (NASA 2008a). Therefore, this EA does not include alternatives to the Constellation Program such as modifying the Space Shuttle fleet, purchasing space transportation services from foreign governments, various designs and configurations for the spacecraft, and multiple launch vehicle options. In addition, the EA does not address the No-Action Alternative of cancellation of the NASA Constellation Program.

By tiering off of the Final Constellation PEIS, the EA also does not address related impacts to other federal or commercial facilities. Impacts from the Constellation Program on the global environment are considered in the Constellation PEIS and are not considered in this document.

A 30-day public review period will be held from 08/11/08 through 09/09/08 to solicit comments on this EA. The public review period shall be announced in a public notice in the New Orleans Times-Picayune (Louisiana) and the Huntsville Times (Alabama). Hardcopies of the EA will be made available to the public during the review period at local area public libraries. An electronic copy of the EA will also be posted on the Constellation National Environmental Policy Act (NEPA) Activities web page: **http://www.nasa.gov/mission_pages/constellation/main/eis.html.**

This EA was also coordinated with pertinent regulatory and resource agencies and local entities. Associated correspondence are included in Appendix A and discussed in pertinent sections of the Final EA.

A copy of the public notice published in the New Orleans Times-Picayune newspaper will be presented as Appendix B in the Final EA.

1.5 Resources Considered but Eliminated From Further Analysis

NASA uses a systematic and interdisciplinary approach to ensure that pertinent resources are analyzed and potential effects are identified. Using this approach, the Proposed Action was determined to have no potential to affect several resources. As a result, these resources were eliminated from further analysis and discussion in this EA. Table 1-1 identifies the resources that would not be affected by the Proposed Action and, therefore, have been eliminated from further analysis.

TABLE 1-1
Resources Considered but Eliminated from Further Analysis

Resources	Rationale
Land Use	Construction and operation of a High Bay Expansion at Building 103 under the Proposed Action would not change the land use designation of the site. Assembly would be contained within the existing footprint of the facility. Other land uses within MAF and land uses in the surrounding region would not be affected in any manner by the Proposed Action.
Wildlife and Protected Species	Based on its location within MAF, the High Bay site and its surroundings provide low quality wildlife habitat. Modification of Building 103 under the Proposed Action would occur entirely within the existing footprint of the Building 103 access road and landscaped lawn and, therefore, would not displace any unique wildlife. No sensitive species are expected to be impacted as a result of construction and operation.
Floodplains	No portion of the Building 103 expansion site is located within the 100-year floodplain. Therefore, modification and operation of the Building under the Proposed Action would have no effect on floodplains.
Vegetation	The High Bay site is mostly paved, and vegetation consists of lawn grasses and weeds. Modification of Building 103 under the Proposed Action would occur entirely within the existing footprint of the Building 103 and its vicinity and, therefore, would not displace any vegetation of local importance. During construction sediment and erosion controls would prevent any indirect impacts to other vegetation at MAF. Operation of the High Bay under the Proposed Action would not involve any activity affecting vegetation.
Wetlands	No wetlands are located within or in the immediate vicinity of the proposed expansion site. Therefore, modification and operation of Building 103's High Bay under the Proposed Action would have no effect on wetlands.
Seismology	Earthquakes are relatively uncommon in the southeastern United States. Four earthquakes of low intensity have been recorded near MAF site during the last 160 years (two in 1843, one in 1882, and one in 1958). These earthquakes were centered northeast of the City of New Orleans, approximately halfway between the city and the northern shore of Lake Pontchartrain. An investigation of seismological conditions was performed in January 1984 by Ken E. Davis Associates. No active faults were detected within 2 miles of the facility. In addition, there are no known fractures or solution channels existing in the area. Therefore, the Proposed Action would have no effect on seismology.
Wastes – Ordnance	There is no indication that ordnance testing took place at MAF.
Wastes - Asbestos, Lead Based Paint, and Polychlorinated Biphenyls	Building 103 has asbestos shingles and may contain lead based paint, but does not contain polychlorinated biphenyls (PCBs). As such, MAF contractors will follow standard procedures for handling asbestos and lead based paints when undertaking the modifications to Building 103 and the High Bay Expansion.

Resources	Rationale
Demographics	Modification to the facilities within Building 103, and construction and operation of Building 103 expansion under the Proposed Action could require some permanent personnel relocation and few employee hires. These are expected to be offset by the ramp-down in the ET Program. The labor force of the local area is expected to be able to provide enough workers to perform the necessary construction with few additional persons relocating to the area.
Housing, Schools and Recreation	Modification to the facilities within Building 103, and construction and operation of Building 103 expansion for a High Bay under the Proposed Action may require permanent personnel relocations and employee hires. These are expected to be offset by the ramp-down in the ET Program. Therefore, the Proposed Action would have no impact on housing, schools, or recreation.
Environmental Justice	On February 11, 1994, President William Clinton issued EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations.* The purpose of this EO is to avoid disproportionate placement of any adverse environmental, economic, social, or health impacts from federal actions and policies on minority and low-income populations. On April 21, 1997, President Clinton issued EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, which recognized that a growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health and safety risks. This EO required federal agencies, to the extent permitted by law and mission, to identify and assess such environmental health and safety risks. Due to the Proposed Action, there would be only minimal impacts to local air quality, noise, groundwater, surface water, and hazardous materials and wastes. As a result, there will not be any measurable impacts to minorities, low-income residents, and children under 17 years of age living in proximity to MAF.
Aviation	Modification to the six facilities within Building 103, and construction and operation of Building 103 expansion to the High Bay at Building 103 under the Proposed Action would not involve any mode of air transportation. The Proposed Action would also not affect airspace or require coordination with airfield operations. As a precautionary measure, aviation lights would be utilized on the exterior of the High Bay to warn approaching aircraft of the Building's presence.

2.0 Description of the Proposed Action and Alternatives

2.1 Description of the Proposed Action

The Proposed Action is to modify facilities within Building 103 and construct and operate a High Bay at Building 103 that would be 150 ft (46 m) tall covering approximately 14,000 ft^2 (~1,300 m^2) at MAF. The modifications and High Bay will be used to conduct welding, tooling and stacking for the upper stage of the Ares I Program, which is a part of the overall Constellation Program. The Ares I launch vehicle consists of two primary elements: a solid fueled First Stage Booster and a liquid fueled Upper Stage. The Ares I will carry to orbit the astronaut crew in the Orion spacecraft, also known as the CEV.

MAF is an 832.5-acre (333-ha) site located in southeastern Louisiana, 16 miles (mi) (25.7 kilometers [km]) east of downtown New Orleans (See Figure 2-1). Within the boundaries of Orleans Parish, MAF is located in the eastern section of metropolitan New Orleans. MAF is bounded by the Gulf Intracoastal Waterway (GIWW) to the south, the Michoud Canal to the east, Old Gentilly Road to the north, and to the west, the Entergy, Inc. commercial electricity generating facility and the New Orleans Fire Training Academy. It is about 100 mi (160 km) above the mouth of the Mississippi River, at latitude N30º1'30" and longitude W89º54'54". Building 103 is located in the northeast quadrant of the MAF and is surrounded by other facilities. The proposed addition would be located in the northeast corner of the existing building (See Figure 2-2).

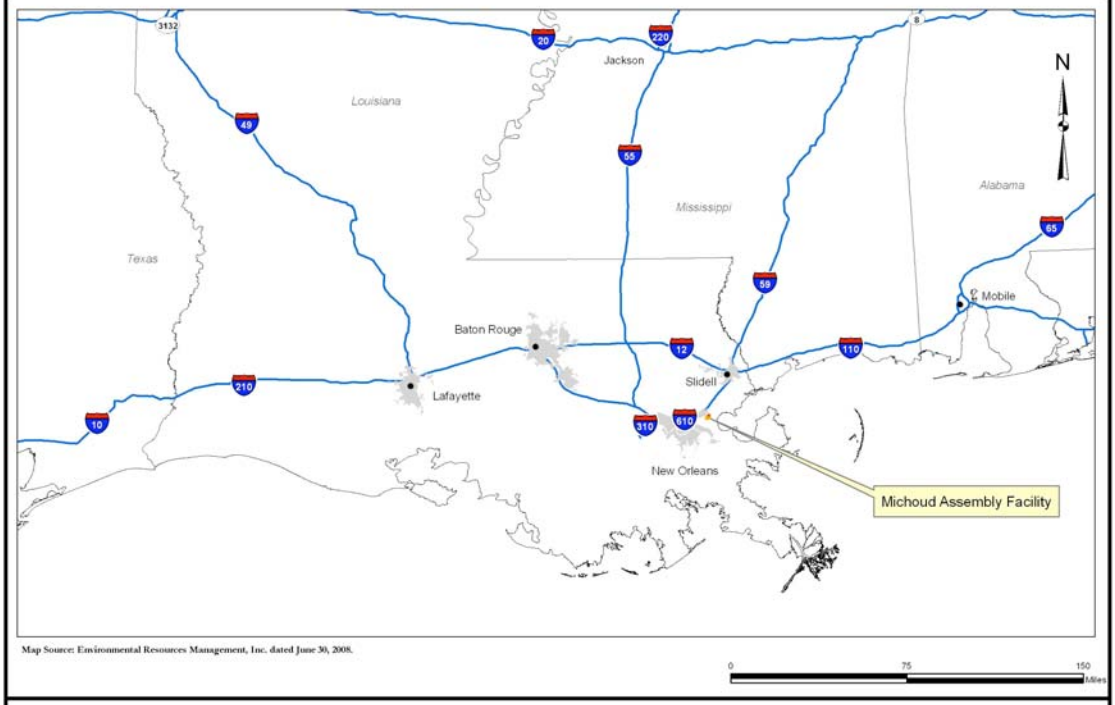

FIGURE 2 -1. Project Location
Modification and Operation of Building 103 at Michoud Assembly Facility (MAF)

NASA
New Orleans, Louisiana

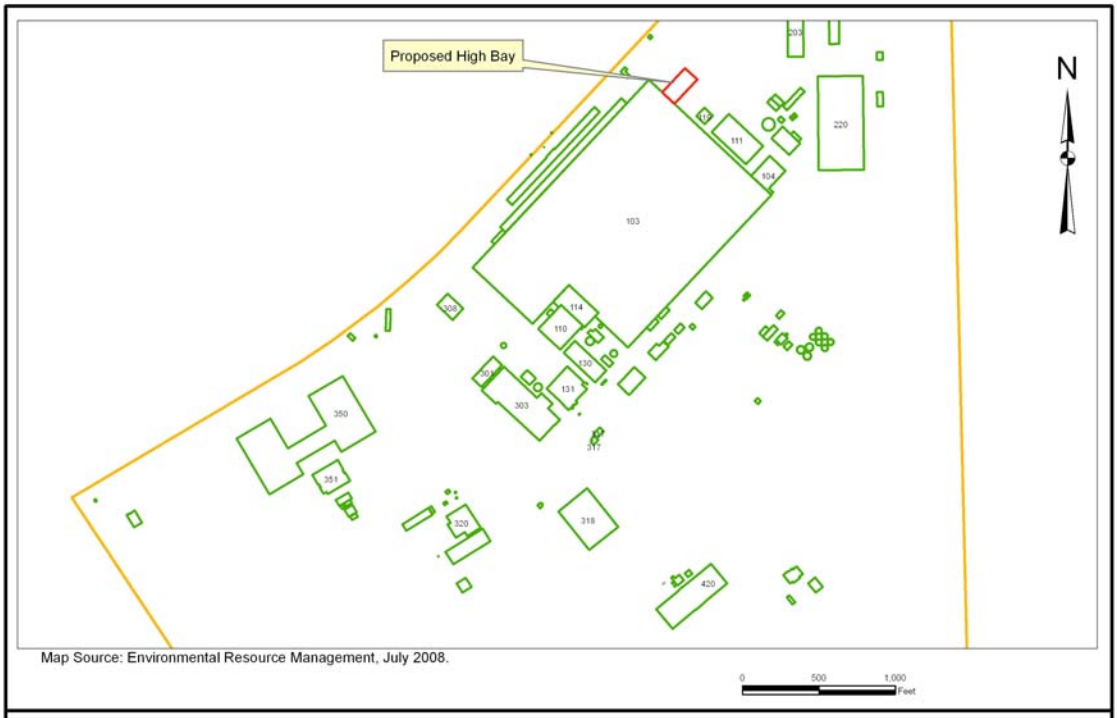

FIGURE 2 - 2. Site Layout
Modification and Operation of Building 103 at Michoud Assembly Facility (MAF)

NASA
New Orleans, Louisiana

Operations to be conducted in the High Bay expansion of Building 103 would include tooling, welding, and stacking to assemble a module of the Ares I program. Specifically, the High Bay would be composed of two stations for vertical assembly welding, two stations for vertical barrel welding and one station for vertical stacking for the upper stage of the Ares I Program. The primary activities in the Building would be welding and assembly. The welding technology is referred to as Friction Stir Welding.

Friction stir welding is a solid-state metal joining process producing high-strength, defect-free joints in metallic materials. The process employs a pin tool with a low rotational speed and applied pressure that "mechanically stirs" two parent materials together to produce a uniform weld. This eliminates the gas type welding and its associated hazards.

Utility and mechanical system upgrades within Building 103 itself would be minimal, because the High Bay would be a stand alone facility with installation of new systems required for the assembly of the Ares I vehicle. Systems required for the High Bay include electrical power, lighting, communications, air conditioning and heating, hydraulic, plumbing, water (cooling and potable) and fire protection.

As stated above, three discrete assembly positions would be constructed within the High Bay at Building 103 to conduct welding, tooling, and vertical stacking for the Ares I vehicle. In addition, approximately six existing facilities within Building 103 would be modified.

2.2 Alternatives to the Proposed Action

2.2.1 No-Action Alternative

The No-Action Alternative is to maintain existing conditions. Under the No-Action Alternative, Building 103 would remain active in its current state to support the remainder of the SSP, for which it was last modified and operated. There would not be adequate work space available within Building 103 to accommodate the vertical assembly welding process without other modifications to Building 103 (i.e., raising the roof, etc.). The No-Action Alternative is analyzed in Section 4 as a baseline against which the Proposed Action can be compared.

2.2.2 Alternatives Considered but Not Carried Forward

NEPA and its implementing procedures, 32 CFR Part 651, require consideration of reasonable alternatives to the Proposed Action. Only alternatives that would reasonably meet the defined need for the Proposed Action require detailed analysis in this EA. There were two additional alternatives considered for creating a work space which could accommodate the vertical assembly welding, including relocation of the process to another NASA center (e.g., MSFC), and alternative modifications to Building 103.

During preliminary planning, NASA evaluated constructing a new High Bay at the MSFC as a potential alternative to modifying Building 103 in support of the Constellation Program. This potential alternative was evaluated in terms of ability to meet the project needs and associated potential impacts. The screening criteria used for analyzing this potential alternative included overall project expense and various siting criteria.

Project expenses for constructing a new High Bay at the MSFC would include those associated with new infrastructure as well as planning, design and environmental permitting for the site preparation and construction activities. Infrastructure expenses would include new access roads and utility connections from other areas. It was concluded that constructing a new assembly facility at the MSFC would be significantly more than the cost of modifying Building 103 at MAF.

In addition to the considerable cost, construction of a new Ares I assembly facility at the MSFC would be complicated by space and environmental constraints. Suitable sites for development at the MSFC are limited and new construction must be consistent with planning policy to seek opportunities to expand existing infrastructure. In general, new construction also has greater potential for environmental impacts than remodeling of existing infrastructure at MAF. For these reasons, the potential alternative of constructing a new Ares I assembly High Bay at the MSFC was rejected as a reasonable alternative to the Proposed Action of modifying and operating a High Bay expansion to Building 103 at MAF. In addition, there are significant programmatic and environmental reasons for constructing the High Bay at MAF as opposed to other locations including:

- Complete manufacturing can occur at MAF saving cost and risk of damage during transportation;
- Less energy will be used for manufacturing due to being able to move Ares I from an attached High Bay into Building 103 for further assembly work instead of transporting by barge to MAF; and
- Alternative sites may have required substantial infrastructure modifications to support the transportation of stages (waterways, roads, etc.).

Creating an adequate workspace for the vertical assembly welding process within the existing Building 103 would require raising the roof in portions of the building to create a High Bay within Building 103. Existing high bay facilities within Building 103 were not available due to prior commitments to other NASA projects. In addition to requiring an alternative modification to Building 103, this would also consume floor space which will be needed for additional Ares V assembly processes in the future. Therefore, construction of a High Bay for Ares I vertical assembly welding within Building 103 was rejected as a reasonable alternative since it would not serve the purpose and need of supporting Ares I production without limiting space available for Ares V production based on personal conversation with NASA's David Williamson (NASA 2008f).

3.0 Affected Environment

3.1 Air Quality

The Clean Air Act (CAA) requires the U.S. Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. NAAQS include primary and secondary air quality standards. Primary standards protect public health, including the health of sensitive populations such as asthmatics, children and the elderly. Secondary standards protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation and Buildings (EPA 2008). EPA has established NAAQS for six principal pollutants, which are called criteria pollutants (Table 3-1). Air Standards for the State of Louisiana are identical to the NAAQS.

TABLE 3-1
National Ambient Air Quality Standards

Pollutant	Primary Standards	Averaging Times	Secondary Standards
Carbon Monoxide	9 ppm ($10mg/m^3$)	8-hour[1]	None
	35 ppm ($40mg/m^3$)	1-hour[1]	None
Lead	1.5 $\mu g/m^3$	Quarterly Average	Same as Primary
Nitrogen Dioxide (NO2)	0.053 ppm ($100\mu g/m^3$)	Annual (Arithmetic Mean)	Same as Primary
Particulate Matter (PM_{10})	150 $\mu g/m^3$		
Particulate Matter ($PM_{2.5}$)	35 $\mu g/m^3$	24-hour[1a]	Same as Primary
	15.0 $\mu g/m$	Annual[2] (Arithmetic Mean)	Same as Primary
Ozone	0.075 ppm	8-hour[3]	Same as Primary
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Mean)	Same as Primary
	0.14 ppm	24-hour[1]	0.5 ppm (1300 $\mu g/m^3$) 3 hour[1]

Notes:
[1]Not to be exceeded more than once per year.
[1a] Not to be exceeded more than once per year on average over 3 years.
[2] 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 $\mu g/m^3$.
[3] 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

mg/m^3= milligrams per cubic meter
ppm = parts per million
PM = particulate matter
$PM_{2.5}$ and PM_{10} = particulate matter less than or equal to 2.5 and 10 microns in size, respectively
$\mu g/m^3$ = micrograms per cubic meter
Source: http://www.epa.gov/air/criteria.html (EPA, 2008)

The quality of the air at MAF is within the limits of the NAAQS, as illustrated in Table 3-2. According to the Louisiana Department of Environmental Quality (LDEQ), St. Bernard Parish is currently in attainment for all Criteria Pollutants (LDEQ 2008).

TABLE 3-2
Ambient Air Quality Exceedences in St. Bernard Parish, for period of 2007

Pollutant	Period of Measurement	Exceedences for St. Bernard Parish (2007)
Carbon Monoxide	Annual mean/max	0
	instantaneous	0
Lead	instantaneous	0
Nitrogen Dioxide (NO2)	instantaneous	0
Particulate Matter (PM_{10})	instantaneous	0
Particulate Matter ($PM_{2.5}$)	instantaneous	0
Ozone	8-hour average	5 [(1)]
Sulfur Dioxide	instantaneous	0

[(1)] Ozone standard requires the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentration to not exceed 0.075 ppm. For period of 2006-2008, the average for St. Bernard Parish is 0.068 ppm.

There are four significant potential air pollution source types at MAF. The techniques for pollution control are either thermal oxidation or carbon adsorption. Each source type is associated with one of the four Clean Air Act/Louisiana State Operation Permits for air emissions. These permits are for utilities, primary production processes, Superlight Ablator (SLA) production, and the groundwater air stripper.

3.2 Noise

Noise levels are usually presented in decibels on the A-weighted scale (dBA) as Day-Night Average A-Weighted Sound Level (DNL). The DNL metric accounts for the greater annoyance of noise during nighttime hours and is calculated by averaging hourly sound levels for a 24-hour period and adding a weighting factor to the nighttime values. The noise guidelines established for land use planning at MAF are the same as those published by the Federal Interagency Committee on Urban Noise in the June 1980 publication, *Guidelines for Considering Noise in Land-Use Planning and Control*. Based on these guidelines, the maximum acceptable noise level for all manufacturing land uses is considered to be 80-85 DNL except in areas where "the public is to be received, office areas, noise sensitive areas, or where the common noise level is low".

The proposed welding, tooling and vertical assembly would take place in an enclosed facility, designed and constructed to absorb noise generated by the various operations necessary to assemble the Ares I launch vehicle. Other noise sources would include vehicle traffic and construction. Normal street traffic within MAF produces noise levels in the range of 70 dBA. Construction activities within MAF produce noise levels in the range of 78 to 89 dBA.

3.3 Cultural Resources

Federal agencies are required to protect and preserve cultural resources in cooperation with state and local governments under NEPA and the National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470, P.L. 95-515).

MAF is located in an area that was part of a 34,500-acre (13,800-ha) royal grant of land obtained by a French merchant from the Governor of the French Colony of Louisiana in 1763. This large tract of land was later named after Antoine Michoud, who bought the then existing sugar plantation in 1827. It remained in the Michoud family until it was sold in 1910. Remnants of the Michoud plantation include two sugarhouse chimneys that stand at the front of the facility. In 1940, the U.S. government acquired the land of current-day MAF as part of a 1,000-acre (400-ha) tract of land purchased by the U.S. Maritime Commission. During the onset of World War II, the 832.5-acre (333-ha) site was selected to be a shipyard. Although shipbuilding at MAF was abandoned in 1942, the facility was used until the end of World War II to build cargo planes. Later, during the Korean War, the site was used to manufacture tank engines. The facility was closed in July 1953 and remained idle until September 7, 1961, when NASA selected the site for the assembly of the first stages of the Saturn IV and Saturn V launch vehicles. These vehicles were used in the Apollo Manned Lunar Landing Program, Skylab Program, and the Apollo Soyuz Test Program (ASTP). In mid-1973 MAF was selected by NASA as the site for manufacturing the ET, a component of the SSP.

Archaeological surveys were conducted at or near MAF in 1981 and 1999. Two potential archaeological sites were identified on MAF property. These include a sugar house from the 19th century Michoud Plantation and a World War II-era brick building. Neither of these sites were determined to be National Register of Historic Places (NRHP) eligible. There are no known archaeological resources on MAF that are listed or eligible for listing in the NRHP (NASA 2008a).

The facility-wide survey conducted in 1999 resulted in two resources (Building 110 and Building 420) being identified as eligible for the NRHP under Criteria A and C. These two buildings were related to the Apollo Manned Lunar Landing Program. See Figure 2-2 for the location of these buildings.

A historical survey was conducted in 2007 to determine structures eligible due to their significant contribution to the SSP. The survey of 2007 added buildings 114, 451, and 452 as eligible for listing in the NRHP. Furthermore, the Louisiana State Historic Preservation Office (SHPO) requested additional information on Building 103. This SHPO request is currently under review by NASA but at this time Building 103, and 68 major tools within the Building, remain ineligible. Proposed modifications would not affect the historic integrity of Building 103 and, therefore, SHPO's review of the additional information requested would not be required to proceed with this project.

3.4 Regional Employment and Economic Activity

MAF is located within the City of New Orleans and the Parish of Orleans, which both cover an area of 180 square miles (mi^2) (466 square kilometers [km^2]). With a 2000 Census population of 484,674, the City's population density was 2,684 people per mi^2 (4,321 people per km^2). Almost 1 year after the Hurricanes Katrina and Rita, the population was approximately 50 percent (%) of the July 2005 levels in the city of New Orleans (Orleans Parish). By 2008, the population of the city of New Orleans was expected to reach nearly 60% of its pre-Katrina level.

The most recent statistics on the New Orleans labor force originate with the 2000 census. In the records for that census, there were 370,138 people who were 16 years or older out of a population of 484,674, or 76%. There were 213,819 people in the labor force (57.8% of those 16 years or older), including 20,203 who were unemployed (9.5%). As a result of the hurricanes, the labor force in the New Orleans-Metairie-Kenner area declined by 20% from 2005 to 2006. By April 2007, the labor force in the area had returned to approximately 75% of the pre-Katrina levels (NASA 2008a).

3.5 Public and Occupational Health and Safety

Police, fire, and health-related emergency and non-emergency services are provided to MAF by plant personnel as well as by the City of New Orleans. Plant personnel can respond on a 24-hour basis to provide these services, which includes a minimum of two trained emergency medical technicians per shift for medical emergencies working out of Building 320. The City maintains a police station and two fire stations within 5 mi (8 km) of MAF that serve MAF and the New Orleans East area. Since Hurricane Katrina, the availability of hospitals has been limited. The nearest available hospitals are Oschner Clinic in Jefferson (18.0 mi/29 km), Lakeside Hospital in Metairie (18.5 mi/29.7 km, and East Jefferson General Hospital (19.2 mi/30.9 km). Other hospitals include Northshore Regional Medical Center (24 mi/38.6 km) and Slidell Memorial Hospital (24.9 mi), both located in Slidell, Louisiana, and Kenner Regional Medical Center (24 mi/ 38.6 km), located in Kenner, Louisiana (LMSS 2006).

3.6 Utilities

3.6.1 Energy

MAF obtains electrical power from New Orleans Public Service Inc. (NOPSI). NOPSI serves approximately 190,000 electric customers and 154,000 natural gas customers in the New Orleans metropolitan area. Headquartered in New Orleans, NOPSI primarily serves residential, commercial, and government customers in the metropolitan New Orleans area. The primary energy supplier to NOPSI is Entergy New Orleans, Inc. (Entergy), which operates oil and natural gas generating plants. While energy consumption by governmental entities dropped in the wake of Hurricane Katrina, in 2007 consumption rebounded to within 10% of pre-Katrina levels (Entergy 2007). However, total governmental energy consumption still totals only about 2% of the total generated by Entergy.

Electrical power, purchased from Entergy, is transmitted to MAF from two offsite substations by 115 kilovolt (kV) transmission lines. Two onsite master substations are located near the northeast and northwest corners of Building 103, respectively.

Natural gas, used for process and heating ventilation and air conditioning (HVAC) requirements, is supplied by Entergy from an offsite main to two onsite natural gas metering stations. The natural gas system distributes gas from these two stations to steam and hot water boilers located throughout the facility. The remaining natural gas lines are run to miscellaneous laboratory taps, unit heaters, emergency generators, a heat treat furnace, and food service equipment throughout the facility.

3.6.2 Water and Wastewater

Water Supply

Potable water, purchased from the Sewerage and Water Board of New Orleans (SWBNO), supplies MAF from an offsite underground 12-in (30.5-cm) diameter main that feeds seven onsite feeder mains (four 12-in [30.5-cm] diameter, two at 8-in [20.3-cm]diameter, and one at 4-in [10.2-cm]diameter). A reserve tank with a capacity of 1,000,000 gallons (gal) (3,785,412 liters [L]), located adjacent to Building 207, provides storage as well as pressurization for this water source. When Hurricane Katrina caused the loss of the SWBNO water source, the water well was used to provide an alternate source of potable water. Installed in October 2005, the 600-ft (182.9-m), 6-in (15.2-cm) diameter water well was pumped into the Building 206 potable water tank for distribution. Plumbing associated with the water well is permanent. In February 2006, the SWBNO supply of potable water returned and the well water was disconnected from the system. However, the well remains active and is immediately available should it be needed for another emergency. Fire water is supplied to MAF fire mains from a reservoir system within the facility (MAF perimeter Borrow Canal) and from the SWBNO potable water system. Pressure is primarily supplied to this system by the 200,000-gal (757,082 L) and 152-ft (46.3-m) elevated storage tank at Building 320 located west of the Building 103. The Building 206 tank also serves to pressurize the fire water system (LMSS 2006).

Contaminated Wastewater

Most of the wastewater currently generated at MAF is associated with the manufacture of the ET. The ET consists of a liquid hydrogen (LH2) tank and liquid oxygen (LO2) tank. MAF operates the Industrial Wastewater Treatment Facility (IWTF) to treat wastewaters from internal and external ET cleaning, hydrostatic testing, Clean Line processing, concentrated chemical tank discharging, heat treating, facility laboratories, and other miscellaneous waters. Tank cleaning, priming and foam applications are performed in climate-controlled cells, which provide containment of liquids and aerosols, minimize the potential release of materials to the environment, and maximize the control of spills and leaks. Small parts preparation and cleaning are performed in an area identified as the Clean Line in Building 103, where large dip tanks are used for cleaning and coating chemicals and rinse waters. Wastewaters generated in areas of production, quality control, laboratory research and testing are routed to the IWTF for treatment before being discharged.

Process wastewater is routed via chemical system piping to the onsite holding tanks at the IWTF. This wastewater is managed in an aboveground system to allow visual observation of lines and immediate control of any breaches or leaks, thus decreasing the potential for environmental effects caused by chemical contaminants.

The IWTF is comprised of Buildings 173, 176, 177, 178, and 179. The IWTF treats the production-generated wastewater at MAF for discharge within regulatory compliance or for reutilization in production operations. Approximately 30-40% of the wastewater entering the IWTF is reused after treatment through the electrodyalisis reversal/demineralizer (EDR/DM) system, operating at a capacity of 320 gallons per minute (gpm) (1,216 liters per minute[L/min]). The concentrated wastewater is treated at a capacity of 300 gpm (1,140 L/min). Sludge is de-watered and stored in bins until shipment offsite for disposal. The treated wastewater is discharged through internal Outfalls 101 and 401 into the onsite Borrow Canal. From there it is pumped into the Intracoastal Waterway through external Outfall 001A located at the pump station, Building 450 (LMSS 2006).

Pollution Prevention

The storm water pollution prevention plan (SWP3), written in January 2006, complements the Spill Prevention Control and Countermeasure (SPCC) plan and the Facility Response Plan (FRP). Required by Part II, section M.3. of the Louisiana Pollutant Discharge Elimination System (LPDES) permit issued to MAF (No. LA0052256), the SWP3 includes descriptions of reasonable methods used to minimize adverse impacts on the drainage system. These methods include maintaining roads and driveway surfaces, removing debris and accumulated solids from the drainage system, and immediately cleaning up spills by dry means whenever possible.

A Toxic Organic Management Plan (TOMP) was approved by LDEQ in 2005. Monitoring for Total Toxic Organics constituents is now waived for Outfall 101A. That plan specifies the toxic organic compounds used at MAF, the method of disposal used instead of dumping, such as reclamation, contract hauling, or incineration, and procedures for ensuring that organics do not routinely spill or leak into the wastewater.

A direct phone extension is available to onsite personnel when there is a need to implement spill control and cleanup measures immediately. Onsite personnel can dial 7-LEAK (7-5325) on a facility phone line to alert Facilities, Environmental Operations, and Security and Safety Departments of potential chemical spills. Response personnel are either onsite or available by phone or pager 24 hours a day, 365 days per year. Cleanup actions are based on the type, quantity, and location of the material spilled. Non-reportable spills and leaks are promptly treated or removed. Typical responses to these conditions include (but are not limited to) the use of absorbents, neutralization, sweeping, vacuuming, and washing of the affected areas. Appropriate regulatory and response agencies are notified when spill volumes or masses exceed reportable quantities (RQs) as defined in the Louisiana Administrative Code (LAC) 33:1, Chapter 39. Notifications are made expediently in accordance with the regulatory requirements. Summaries of spill events are maintained in a "Spill Log". Summaries of spill events involving quantities less than the RQs that affect or have the potential to affect the natural water environment are included in the monthly Discharge Monitoring Reports (DMRs) per LPDES permit, as appropriate (LMSS 2006).

Sanitary Wastewater

The sanitary sewerage system consists of underground gravity flow piping, 32 sewer lift stations and a system of force mains varying in size from 2 to 12-in (5.1 to 30.5-cm) in diameter. The gravity lines collect waste from the various buildings onsite and transfer the waste to the lift stations. The sewer lift stations pump the waste through the force main system to a central metering station located at the northeast corner of MAF. The sewage is then fed to a 30-inch (76.2-cm) SWBNO force main for final discharge and treatment at its 122 million gallons per day (mgpd) (~462 million liters per day [L/d]) East Bank Treatment Facility located off MAF property. The system serves major office and production areas as well as many other smaller maintenance and storage buildings (LMSS 2006).

3.7 Transportation

3.7.1 Roadways

There are a total of approximately 120,000 square yards (yrd^2) of major paved roads and 30,000 yrd^2 of major unpaved roads (100,335 and 25,084 m^2, respectively) at MAF. Parking areas, paved and unpaved, total approximately 550,000 and 20,000 yrd^2, respectively (459,870 and 16,723 m^2, respectively), and provide parking spaces for several thousand vehicles. MAF is easily accessed by a well maintained system of roads.

3.7.2 Railroads

Rail services are available to MAF. The use of planes and trucks for shipping purposes has decreased the demand for rail transportation. A railhead located near the northern boundary of MAF serves the site as the need arises.

3.7.3 Waterways

As shown in Figure 1-1, MAF has excellent access to docking facilities along the Intracoastal Waterway. NASA has overall responsibility for all special water transportation of spacecraft components and related cargo between ports. NASA monitors cargo loading, unloading, and in-transit care of the barges. MAF docks have a recess for roll-on and roll-off loading and unloading. Water transportation was developed because the distances between manufacturing, static testing, and launch sites, as well as the size, weight, and sensitivity of the cargo, might preclude the use of highway, rail, and air transport. NASA has two covered river-ocean barges (*Poseidon* and *Pegasus*) and one open shuttle barge (*Pearl River*), with the home port being New Orleans, Louisiana.

3.8 Solid Waste

A variety of wastes are generated at MAF, including hazardous, non-hazardous, and industrial solid waste, as well as office trash that includes garbage. There were eight types of solid/non-hazardous waste generated in 2005.

MAF's pollution prevention plan includes historical and current waste minimization missions and programs. One component of that plan is the recycling of office paper, aluminum cans, plastic bottles, wood and other discarded materials. Recycled material bins are conveniently located throughout the manufacturing area and office areas at MAF in order to optimize the extent of recycling.

3.9 Hazardous Waste Management

Federal hazardous waste regulations are contained in 40 CFR Parts 260 to 279, and are a result of Subtitle C of Resource Conservation and Recovery Act (RCRA), which requires a program to track hazardous waste from generation to storage to transportation to disposal. MAF is a RCRA large quantity generator averaging over 38,000 pounds (lbs) (17,100 kilograms [kg]) of hazardous waste per month in 2005. Additionally, MAF is a RCRA permitted treatment, storage, or disposal facility (TSDF). There is a permitted container storage building and three permitted storage tanks for flammable solvent waste.

NASA maintains a comprehensive inventory of the RCRA-defined hazardous wastes and controlled wastes not regulated by RCRA. The collection and management of hazardous waste data are the responsibility of the Environmental Support Contractor (ESC). MAF has established hazardous and controlled waste accumulation site inspection guidelines that serve to monitor the accumulation activities of each generating activity throughout the facility.

Full drums of wastes are stored temporarily in the Hazardous Waste Storage Facility (HWSF). Within a 60- to 70-day time period, the ESC arranges for shipment of the containers to an appropriate TSDF, so that MAF is not subject to regulation under RCRA as a HWSF. Similar waste is combined within a consolidation area in the HWSF. Hazardous wastes are disposed offsite at several hazardous waste disposal facilities approved by EPA. Wastes are transported from MAF by licensed hazardous waste transporters. Special wastes generated at MAF include

asbestos, industrial waste, petroleum-contaminated soil and water from spill cleanup, and medical waste.

There is an ongoing effort (began in the 1980s) to replace toxic metals in the chemical compounds and solutions used in the manufacture of the ET. These toxic metals include a chromated leak detection material, a chromated hydrostatic test solution, and chromated primer material.

NASA is continuing to phase out ozone depleting substances, in favor of more environmentally acceptable materials. This effort began in 1991 and includes the chemicals chlorofluorocarbons (CFC)-ll, CFC-12, CFC-1l3, methyl chloroform, hydrochlorofluorocarbons (HCFC)-141b, HCFC 225, and HCFC-22.

3.9.1 Storage and Handling

Thirty-six types of hazardous waste were generated in 2005. NASA anticipates a reduction in hazardous waste generation of 15% by 2011, using 2005 as the baseline year. MAF is a RCRA large quantity generator averaging over 38,000 lbs (17,100 kg) of hazardous waste per month in 2005. As indicated previously, MAF is a RCRA permitted TSDF. There are several containers of flammable solvent waste generated during the construction of the ET, including one permitted container storage building and three permitted storage tanks.

3.10 RCRA Program

The NASA MAF is an operating facility that began industrial operations in 1945. MAF has been operated by various contractors under NASA since approximately 1961. In 1972, the facility was designated as the site where the Space Shuttle's ET would be manufactured and assembled. The RCRA program at the Site has been ongoing since 1984 (LMSS 2006).

3.10.1 Contaminated Areas

MAF is not on EPA's National Priorities List (NPL), which requires compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Under the RCRA program and on behalf of NASA, Lockheed Martin Space Systems Company (and under previous company names) has conducted several investigations, pilot studies, remediation programs, and monitoring programs at MAF addressing several different areas at the Site. In 1985, due to soil and ground water impacts, corrective action activities were initiated at the facility. The Part B Hazardous Waste Permit for the facility was approved by LDEQ in 1987 and included requirements for completing the RCRA Facility Investigations (RFIs). From 1987 through 1998, the RFI process was conducted and several Solid Waste Management Units (SWMUs) and areas of concern (AOCs) were identified that required additional activities to address soil and ground water (and other media) impacts by constituents of concern (COCs). The majority of areas are closed at MAF but there are active areas including AOCs, B, D, F, G and others. AOC F (External Tank Clean Line) and AOC G (Chrysler Clean Line) are located within Building 103. The Proposed Action construction area is not located in an area known to be impacted by these AOCs.

3.11 Storage Tanks

There are numerous Aboveground Storage Tanks (ASTs) and Underground Storage Tanks (USTs) used to store water, store fuels and oils, gases, chemicals and wastes at MAF. Please see Figure 3-1 for view of the Proposed Action construction area and vicinity of Building 103.

MAF maintains a SPCC Plan as required by Oil Pollution Prevention regulations found in 40 CFR Part 112 and LAC 33:IX, Chapter 9-Spill Prevention and Control, and LAC 33:1.3931 (Reportable Quantity List for Pollutants) of the Notification Regulations and Procedures for Unauthorized Discharges. The MAF SPCC Plan specifies procedures and methods, and describes equipment and other structural devices to prevent the occurrence of unauthorized discharges (spills) of oil and hazardous substances into the environment. The plan is thoroughly reviewed at least every three years, but is always kept current. The SPCC Plan was last updated in November 2005 and was reviewed for applicability, completeness, and good engineering practices in November 2006.

MAF also maintains a FRP as required by the Oil Pollution Act of 1990 (OPA) regulations found at 40 CFR 112.20. The MAF FRP addresses the expeditious mitigation of oil spills to minimize impact to the environment. The plan prepares onsite personnel to respond to a worst-case discharge of oil (calculated to be 11,905 barrels, or 500,000 g [1,892,500 L], of No.2 fuel oil). Updated annually, the FRP ensures that the current facility operations, capabilities and conditions are accurately described. The FRP was last updated in November 2005.

Figure 3-1. Water Storage Tank in Vicinity of Building 103

3.12 Topography, Geology and Soils

3.12.1 Topography

MAF is located in the southern portion of the Lake Pontchartrain Basin in the Mississippi Deltaic Plain, which is characterized by low elevation and relief, as well as gentle slopes. The land surface north of Lake Pontchartrain provides the highest elevation and then dips southward to the Mississippi Deltaic Plain.

The most conspicuous topographic features within the Pontchartrain Basin are the natural levees of the Mississippi River and its abandoned distributaries. Along the current river course (which marks the southern limit of the basin), levee crests are a maximum of about 23 ft (7 m) above sea level and usually average 12 to 15 ft (3.7 to 4.6 m). Distributary channel levees do not exceed 10 ft (3.0 m) and about 40% of the basin is relatively flat, closely approximating sea level.

Much of the New Orleans vicinity lies below sea level. Because of the alteration of natural land, former marshes and swamps on the Deltaic Plain have been bounded by levees and drained. Dehydration of sediments has resulted in surface soils compaction, with resulting land surface subsidence of up to 9 ft (2.7 m) in some locations in the New Orleans urban area.

As typified by the Mississippi delta, the New Orleans East area is flat and low. There is little difference in elevation at MAF compared to surrounding areas. The top of the flood protection levee along the GIWW is approximately 15 ft (4.6 m) above mean sea level (msl) while the northern edge of the site ranges from 2 to 5 ft (0.6 to 1.5 m) above msl. The entire MAF property is reclaimed marshland, with surficial materials composed entirely of man-made fill (a mixture of topsoil and river sand) (LMSS 2006).

3.12.2 Geology

MAF is situated within the Gulf Coast Geosyncline, a portion of the earth's crust that has been subsiding for millions of years. Concurrent with this regional sinking, a great thickness of sedimentary deposits has accumulated. Most of the sedimentation occurred in historical coastal and shallow marine environments. Deep borings reveal numerous ancient deltas, the deposits of which are stacked like a great pile of leaves in the geosynclinal trough.

The recent deposits in this coastal deltaic region were laid down by periodic shifts in the bed channel of the Mississippi River. Two depositional phases of the St. Bernard delta lobe built the area. The base was deposited in the first phase when sedimentation partially filled the Pontchartrain embayment 4,500 to 3,500 years ago. A second phase of sedimentation 1,900 to 500 years ago deposited material into the area to form the land mass that was eventually reclaimed and developed into the MAF site.

The oldest geologic deposits underlying MAF are of Pleistocene Age. These deposits outcrop in the vicinity of Baton Rouge and dip beneath the surface in a southwesterly direction. At the end of the Pleistocene Age, sea level had been lowered 400 to 450 ft (122 to 137 m) below its present level and the Mississippi River Valley system had become deeply entrenched in the coastal plain sediment.

Approximately 3,500 to 5,000 years ago, as the sea level approached its present elevation, the entrenched valley was gradually filled with Holocene (recent) alluvial sediments that covered the exposed, weathered, and eroded surface of the Pleistocene Age. After the sea reached its present level, the Mississippi River migrated back and forth across the alluvial plain, building a series of delta complexes. The river continually shifted the center of deposition to areas with steeper gradient. The shifting displaced the Gulf of Mexico waters with deposits of fine-grained material, eventually forming the existing deltaic plain.

The Pleistocene deposits in the area are known as the Prairie Formation. They were laid down during the last major interglacial stage in a deltaic or shallow marine environment, were exposed to weathering and erosion during the last glaciation, and have been buried by Holocene deposits within the last 6,000 years. The surface of the Prairie Formation slopes Gulf ward at the rate of about 2 ft/mi (0.38 m/km) from its outcrop area north of Lake Pontchartrain.

The Pleistocene sediments typically consist of well-oxidized, firm to stiff silty and sandy clays. In general, the silty clays are more common in the western areas, whereas the sandy clays are more common in the eastern areas. In both cases, the sediments have a distinctive lower water and organic content and higher strengths than the Holocene sediments above.

The land beneath MAF is an extension of the St. Bernard Delta of the Mississippi River deltaic plain. Subsurface deposits at the site typically are deltaic deposits of gravel, sand, silt, clay, and organic materials. Sand and gravel deposits represent ancestral channels and beaches, organic material deposits represent interdistributary deposits, and silt and clay deposits represent overbank and prodelta deposits.

Massive deltaic deposits are previously deposited, fine-grained, prodelta materials that occurred as a result of compaction of the lower deposits. The area remains stable as long as the rate of deposition equals or exceeds the rate of subsidence. A reduction in sediment load to the area generally causes a net subsidence. Relocation of the main channel of the Mississippi River and construction of levees has reduced sediment loads and deposition in the St. Bernard Delta area. The St. Bernard Delta region currently is subsiding at a rate ranging from 2 to 16 ft (0.6 to 4.9 m) per 100 years. The depth to bedrock typically is great in the deltaic depositional area. There are at least 1,200 ft (366 m) of sediments beneath MAF. Bedrock beneath the facility consists of shale and sandstones (LMSS 2006).

3.12.3 Soils

Surface soils in this geologic region, where land forms are principally swamp, marsh, and natural levee, vary from highly organic to inorganic silts, highly plastic clays, lean clays, sandy silts, and minor amounts of sand (LMSS 2006).

3.13 Groundwater

There are four groundwater aquifers beneath MAF. These are the semi-confined Shallow (Alluvial), the confined 100-ft sand, the 700-ft sand, and the 1,200-ft sand. Relevant to this assessment is the Shallow Aquifer.

The Shallow Aquifer is a hydrogeologic unit found between 20 and 50 ft (6.1 and 15.2 m, respectively), below ground surface (bgs). It is composed of sandy silt and silty sand inter-bedded with layers of fine sand. This unit represents the uppermost water bearing formation beneath the facility. The unit is very heterogeneous. Clay layers up to 4 ft (1.2 m) thick are present and sand textures range from fine to coarse. The Shallow Aquifer is hydrologically connected with the Michoud Canal and the GIWW.

Unconfined groundwater exists above a 20-ft (6.1-m) depth within heterogeneous silt, sand, clay, and organic soil, although this layer is not strictly an aquifer. This surficial groundwater is hydraulically connected to and discharges horizontally at very slow rates to onsite subsurface drainage and sewer piping and eventually to the perimeter Borrow Canal. The surficial groundwater level is approximately 1 to 4 ft (0.3 to 1.2 m), bgs across MAF.

Water in the Shallow Aquifer in the region has been characterized as slightly brackish to estuarine and does not meet drinking water standards. The water is highly mineralized, as evidenced by the specific conductance values, which generally range from 8,880 micromhos per centimeter (µmhos/cm) to 20,100 µmhos/cm. The elevated levels of chloride, as high as 4,270

milligrams per liter (mg/L), suggest that the saline surface waters in the Michoud Canal, and GIWW influence the quality of the shallow groundwater.

There are no active drinking water wells on the MAF or within 1 mi (1.61 km) of the property, due to unsuitable shallow groundwater quality. There are no sole or principal drinking water aquifers in the region (per Section 1424 [2]g of the Safe Drinking Water Act [42 U.S.C. & 300 f *et sequentes*.]) of the MAF site (LMSS 2006).

3.14 Surface Water

MAF lies within the New Orleans coastal area of southeastern Louisiana. Bounded on the west, south, and east by the Michoud Slip, the GIWW, and the Michoud Canal, MAF is also located near the major water bodies of Lakes Pontchartrain and Borgne. There is no natural surface drainage system within 1,000 ft (304 m) of MAF. The nearest surface water body to MAF is the Michoud Canal.

MAF's drainage system is composed of open drainage ditches, catch basins, and underground pipes that deliver storm water into the Borrow Canal. These ditches, basins, pipes, and canals are not surface waters and not waters of the State of Louisiana, but are water conveyance devices, meant to maximize flood protection for buildings within the site. The Borrow Canal provides MAF with the capacity and means to contain major spills within its boundaries. Water in the Borrow Canal is maintained with a wier at a fairly consistent level (approximately -4 ft [-1.2 m), msl) to help prevent soil subsidence.

No natural streams or rivers pass through the property. The adjacent GIWW is designated for recreational purposes. There are no rivers in the area that are designated as wild or scenic under the Wild and Scenic Rivers Act (P.L. 90-542, as amended; U.S.C. 1271 – 1287) or designated as having the potential for inclusion under this act (LMSS 2006).

4.0 Environmental Consequences

This section provides a detailed analysis of the potential consequences associated with the implementation of the Proposed Action and the No-Action Alternative. Criteria for determination of significance of the potential consequences are defined in Table 4-1.

TABLE 4-1
Significance Criteria for Potential Consequences

Significance	Criteria
No Effect	No Effects Expected.
Minimal	Impacts are not expected to be measurable, or are measurable but are too small to cause any change in the environment.
Minor	Impacts that are measurable, but are within the capacity of the impacted system to absorb the change, or the impacts can be compensated with little effort and resources so that the impact is not substantial.
Moderate	Impacts that are measurable, but are within the capacity of the impacted system to absorb the change, or the impacts can be compensated for with little effort and resources so that the impact is not substantial.
Major	Environmental impacts which individually or cumulatively could be substantial.

4.1 Air Quality

4.1.1 Proposed Action

The quality of the air at MAF is within the limits of the NAAQS. MAF is not within a NAAQS non-attainment region. Therefore, there is no need for a NAAQS conformity analysis that would explain how NAAQS criteria pollutants emitted from MAF would conform to Louisiana's State Implementation Plan (SIP).

Modification and operation of the High Bay at Building 103 under the Proposed Action would result in short-term, minor impacts to air quality. Fugitive dust (particulate matter [PM]) and construction vehicle exhaust emissions would be generated during construction and would vary daily, depending on the level and type of work conducted. Fugitive dust would be controlled at the sites using best management practices (BMPs) such as the periodic watering of stockpiled material. Pollutants emitted from the internal combustion engine exhausts of construction vehicles and equipment include nitrogen oxide (NOx), carbon monoxide (CO), particulate matter of 10 microns or smaller (PM_{10}), and volatile organic compounds (VOCs). These types of exhaust emissions would be temporary, and at their expected generation levels, would not significantly affect air quality. Fugitive dust and exhaust emissions from the proposed construction activities would not collectively represent a new major source of air emission and, therefore, would not require a modification to the Title V permit under which MAF operates.

The primary air emissions expected from the welding operations planned to be conducted in the High Bay would be particulate matter, and particulate-phase hazardous air pollutants. Air pollution controls (such as fume control equipment, etc.) would be implemented for workplace safety which will be sufficient to prevent these pollutants from escaping MAF at levels which could impact local air quality.

Operation of the High Bay would also not include any new source of air emission that would be regulated under an air operating permit.

For these reasons, the Proposed Action would have a minor impact on air quality during construction, and minimal impacts during operation.

4.1.2 No-Action Alternative

Under the No-Action Alternative, modifications to the facilities within Building 103 and expansion of Building 103 by constructing a High Bay would not be modified or operated to conduct welding, tooling and vehicle stacking for the Constellation Program. Therefore, the No-Action Alternative would have no effect on air quality.

4.2 Noise

4.2.1 Proposed Action

Modifying the approximately six facilities within Building 103 and operating Building 103 expansion with a High Bay facility will not increase noise levels beyond those that exist today. As noted, the welding, tooling and vertical assembly will take place in an enclosed facility that will be designed and constructed to absorb noise generated by the various operations necessary to assemble the Ares I launch vehicle. Normal street traffic within MAF produces noise levels in the range of 70 dBA.

Construction

Under the Proposed Action, construction activities associated with the modification of Building 103 would temporarily increase ambient noise levels at and around the site. The expected construction-related noise levels in the vicinity of the Building 103 expansion were estimated using a number of reports prepared by EPA on general noise conditions in the United States. Based on data presented in the EPA publication, *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* (EPA 1971), outdoor construction noise levels range from 78 dBA to 89 dBA, approximately 50 ft (15.2 m) from a typical construction site. The increased noise levels would be short term and limited to normal working hours. Based on the EPA estimates of noise dissipation previously described, construction-related noise would not be audible in the nearest residential area, which is located over 0.75-mile (1.2-km) from the Building.

Operations

Activities associated with welding, tooling and assembly stacking in the High Bay attached to Building 103 are expected to generate noise levels that are comparable to those generated by other existing activities conducted in Building 103. Because MAF is located in a highly industrialized area with natural areas providing a buffer zone between noise producing activities at MAF and the residential communities within New Orleans, noise levels should have no impact on residential populations. Workers in the High Bay should use hearing protection and follow OSHA standards and procedures. The project safety representative will monitor operational noise levels and would ensure that all noise protection measures are implemented during welding, tooling and assembly stacking activities.

Conclusion

The Proposed Action would have minor short-term noise impacts due to construction-related sources, and minimal long-term noise impacts due to operations.

4.2.2 No-Action Alternative

Under the No-Action Alternative, modifications to the six facilities within Building 103 and the High Bay addition to Building 103 would not be modified or operated to conduct vehicle assembly in support of the Ares I for the Constellation Program. Therefore, the No-Action Alternative would have no noise-related effects.

4.3 Cultural Resources

4.3.1 Proposed Action

As noted in Section 3.3, no Native American concerns or traditional resources have been identified within the MAF's boundaries, and previous activities at the site make it unlikely that Native American sites would be discovered on MAF property. For this reason no additional archeological surveys were performed for the area of construction, which will be impacted by grading and excavation.

Structure 451 and Buildings 110,114, 420, and 452 have been identified as eligible for the NRHP. Construction or operation of the High Bay adjacent to Building 103 will not affect any sites eligible for protection. Additional information has been requested by the Louisiana SHPO to determine potential future eligibility for Building 103.

Constructed in 1943, Building 103 was initially surveyed in 1999 as part of a facility-wide inventory of the MAF. Following the survey, consultation between NASA and the Louisiana Division of Historic Preservation led to a determination that the building was not eligible for the NRHP. A SSP specific survey in 2006 looked at the major tooling inside the building used to construct components of the Space Shuttle ET.

Building 103 contains 68 major tools that fabricate, assemble, and transport the ET and its components, chiefly the oxygen (LO2) tank, the intertank, and the hydrogen (LH2) tank. Although a number of the tools are large, the major tooling in Building 103 is not unique in the aerospace industry or in other manufacturing industries where large components are welded, machined, assembled, sprayed, and transported. One of the more recent tools, just three years old, is a friction welder. This tool is unique, but no ET welded on it has yet flown in a mission. A number of the major tools have been relocated within Building 103 and no longer occupy the same location as when they were first installed. For these reasons, the major tooling in Building 103 does not have significance under the NRHP criteria and was recommended ineligible for the NRHP.

In order to keep the knowledge associated with the major tooling from being lost over time as the MAF transitions to the next NASA program, however, LA SHPO proposed that a record of the tooling be retained so that the information can be made available to NASA, MAF personnel, and space hardware researchers in the future. A record would include tooling diagrams, floor plan location maps, and photographs. Reports associated with the tooling would become part of the record (NASA 2008b). NASA plans to engage in additional surveys and consultation with SHPO with respect to Building 103, but at this time Building 103 is still not determined eligible for protection under the NHPA. Proposed modifications would not affect the historic integrity of

Building 103 and, therefore, SHPO's review of the additional information requested would not be required to proceed with this project. In addition, construction or operation of the High Bay adjacent to Building 103 would not affect the historic integrity of the tooling inside Building 103 and therefore minor impacts are expected due to construction and modification.

4.3.2 No-Action Alternative

Under the No-Action Alternative, Building 103 would not be expanded or operated to conduct welding, tooling and assembly for the Ares I in support of the Constellation Program. Therefore, the No-Action Alternative would have no effect on cultural resources.

4.4 Regional Employment and Economic Activity

4.4.1 Proposed Action

It is expected that the construction work associated with the modifications to the six facilities within Building 103 and expansion of Building 103 under the Proposed Action would require a temporary workforce of approximately 200 jobs. Approximately the same number of jobs would be added on a long-term basis to support the new production at the site. This would have a minimal impact on the total labor force, employment or unemployment in the region, because added employment would be offset by the loss of employment incurred due to the retirement of the SSP. Therefore, regional employment and economic activity would have a minimal effect on the local economy. Expenditures for construction-related materials and supplies would have a minor beneficial effect on the economy of the region. Businesses near MAF such as retail gasoline stations and restaurants could benefit from additional sales to workers. No new schools would be needed as a result of the proposed modifications and additions. For these reasons, the Proposed Action would have a minimal positive impact on regional employment and economic activity.

4.4.2 No-Action Alternative

Under the No-Action Alternative, Building 103 expansion would not be undertaken or operated to conduct assembly activities in support of Ares I for the Constellation Program. Therefore, the No-Action Alternative would have no effect on regional employment and economic activity.

4.5 Public and Occupational Health and Safety

4.5.1 Proposed Action

Modification of Building 103 under the Proposed Action would create approximately 200 temporary positions at MAF, while operations of Building 103 would create approximately 200 permanent positions. Therefore, the Proposed Action would have a minimal effect on occupational medicine and environmental health services. The future operation of Building 103 would not involve any activity that would affect public health and safety. Workers in Building 103 and its expansion would follow OSHA standards and procedures and the project safety representative will ensure that appropriate safety measures are implemented during assembly activities. Modification of Building 103 will include upgrading/installing safety features such as emergency alarms systems, handrails, guard rails, ladders, eye wash stations and first aid kits. The MAF security program, which includes access control at the perimeter of the Building 103, is considered to be sufficient for providing security. Modification of Building 103 would include upgrading/installing fire detection and suppression features such as alarm systems, smoke

detectors, and fire extinguishing systems. For these reasons, the Proposed Action would have a minimal impact on public and occupational health and safety.

4.5.2 No-Action Alternative

Under the No-Action Alternative, Building 103 would not be expanded or operated to conduct assembly activities as part of the Ares I for the Constellation Program. Therefore, the No-Action Alternative would have no effect on public and occupational health and safety.

4.6 Utilities

4.6.1 Electrical Power

Proposed Action

Expansion of Building 103 under the Proposed Action would involve upgrading existing utility systems and installing new utility systems, including electrical power, air conditioning and heating, plumbing, and water (cooling, potable, distilled, and de-ionized). Preliminary evaluations of the current condition and suitability of the existing utility infrastructure at Building 103 to support Ares I for the Constellation Program have been conducted. The existing system upgrades and new system components are being designed in conjunction with other proposed modifications to the building.

Operation of Building 103 expansion would increase energy consumption. There is a possibility that MAF may install a new electric substation to handle the additional load. It has been determined that the increase in energy demand would not overburden the existing energy utility system of the Center. For these reasons, the Proposed Action would have a minimal impact on utilities.

No-Action Alternative

Under the No-Action Alternative, Building 103 expansion would not be undertaken or operated to conduct assembly of Ares I for the Constellation Program. Therefore, the No-Action Alternative would have no effect on utilities.

4.6.2 Water and Wastewater

Proposed Action

The Proposed Action would not affect water supply from either SWBNO or the supplemental water well installed following Hurricane Katrina. In addition, the action would not affect emergency firewater supplies from the reservoir system within the facility (the perimeter Borrow Canal).

The Proposed Action may increase potable water consumption and domestic wastewater and solid waste generation at the Center, but not enough to require additional infrastructure development. Operation of Building 103 expansion would produce little or no process/industrial wastewater.

Industrial wastewater is currently being thoroughly pre-treated and disposed as described in Section 3.6.2. Proposed modifications to Building 103 and the addition to this facility would not change industrial wastewater treatment processes or require expansion of the existing process sewer system. Therefore, the Proposed Action would have a minimal impact on water and wastewater utilities at the site.

No-Action Alternative

Under the No-Action Alternative, Building 103 expansion would not be undertaken or operated to conduct assembly of Ares I for the Constellation Program. Therefore, the No-Action Alternative would have no effect on water and wastewater.

4.7 Transportation

4.7.1 Proposed Action

Modification of Building 103 would temporarily increase traffic in the area during construction. In addition, modifications to the facilities within Building 103 and construction and operation of Building 103 expansion under the Proposed Action would result in an increase the number of long-term personnel at MAF. However, the projected increase is not expected to require an expansion of the road or parking system at or around MAF. Modification of Building 103 under the Proposed Action would not involve widening the facility access road or expanding the paved parking areas at the site. For these reasons, the Proposed Action would have a minimal impact on roadways.

Building 103 expansion would not adversely impact the existing CSX Railroad, which is about 0.75 mile (1.2 km) from Building 103. Use of the CSX Railroad for operations at Building 103 in support of Ares project are expected to be similar to uses currently occurring in support of the SSP, therefore, the proposed action would have minimal impact on railroads. Impacts related to transportation of the Ares I Upper Stage from MAF to Kennedy Space Center (KSC) are addressed in the Final Constellation PEIS.

The GIWW, which is operated and maintained by the U.S. Army Corps of Engineers (USACE) and adjacent to the MAF, does not require any alterations or improvements as a result of Building 103 expansion. Use of the GIWW for operations at Building 103 in support of Ares project are expected to be similar to uses currently occurring in support of the SSP, therefore, the proposed action would have minimal impact on waterways. For these reasons, the Proposed Action would have a minimal impact on waterways.

4.7.2 No-Action Alternative

Under the No-Action Alternative, modifications to the facilities within Building 103 and constructing the Building 103 expansion would not be undertaken in order to assemble the Ares I for the Constellation Program. Therefore, the No-Action Alternative would have no effect on roadways.

Under the No-Action Alternative, Building 103 would not be modified or operated to conduct assembly of the Ares I for the Constellation Program. Therefore, the No-Action Alternative would have no effect on railroads.

Under the No-Action Alternative, Building 103 expansion would not be constructed or operated to conduct assembly operations for the Ares I for the Constellation Program. Therefore, the No-Action Alternative would have no effect on waterways.

4.8 Hazardous/Toxic Materials

4.8.1 Storage and Handling

Proposed Action

Construction and operation of Building 103 expansion and modifications to the facilities within Building 103 under the Proposed Action would require temporary storage and handling of hazardous materials such as paints, solvents, fuels, lubricants and oils. The storage and handling of hazardous materials and wastes at the facility would be conducted in accordance with local, state and federal laws and regulations, as well as with the applicable MAF management plans and pollution prevention measures.

For these reasons, the Proposed Action would have a minimal impact on storage and handling of hazardous materials.

Solid waste generated during construction activities will be disposed of at an approved Construction Landfill. This will have a minimal impact on solid waste disposal at the site.

No-Action Alternative

Under the No-Action Alternative, Building 103 expansion would not be built or operated to conduct assembly of the Ares I for the Constellation Program. Therefore, the No-Action Alternative would have no effect on storage and handling of hazardous materials.

4.8.2 Waste Management

Proposed Action

Construction and operation of Building 103 expansion and modifications to the facilities within Building 103 under the Proposed Action would require management of accumulated wastes such as those associated with paints, solvents, fuels, lubricants, and oils. Wastes accumulated at Building 103 would be stored temporarily at a designated satellite accumulation point and then transported to a HWSF and then shipped to an appropriate Treatment, Storage and Disposal Facility. Waste management at Building 103 expansion would be conducted in accordance with local, state and federal laws and regulations, as well as with all applicable NASA management plans and pollution prevention measures.

For these reasons, the Proposed Action would have a minimal impact on waste management.

No-Action Alternative

Under the No-Action Alternative, Building 103 expansion would not be constructed or operated to conduct assembly of the Ares I for the Constellation Program. Therefore, the No-Action Alternative would have no effect on waste management.

4.8.3 Contaminated Areas

Proposed Action

Because the Building 103 expansion is located within an area of MAF where groundwater contamination does not exist, construction activities associated with the proposed modification of the building would not fall under RCRA (personal communication with Mr. Keith Savoy, NASA). Therefore, a dig permit for utility work and pile driving within the footprint of the

building would not be required. In addition, MAF project safety representative would implement applicable worker safety measures during construction activities.

Modification and expansion of Building 103 and operations under the Proposed Action would not involve withdrawals from or discharges to groundwater. As such, the Proposed Action would not directly impact contaminated groundwater located at other areas of MAF or indirectly cause it to spread within the residuum or migrate upward or downward into the bedrock.

For these reasons, the Proposed Action would have a no impact on contaminated areas.

No-Action Alternative

Under the No-Action Alternative, Building 103 expansion would not be built or operated to conduct assembly of the Ares I for the Constellation Program. Therefore, the No-Action Alternative would have no effect on contaminated areas.

4.8.4 Lead-Based Paint

Proposed Action.

Portions of Building 103 were initially painted with Lead-Based Paint (LBP) and its outside shingles are asbestos (See Figure 4-1). Although the Building 103 expansion is still in the design phase, there may be a need to modify the existing building as part of the expansion construction. The LBP and asbestos management and waste disposal would be conducted by the EEOH Office during the modification and operation of Building 103 expansion in accordance with all applicable federal, state, local, and NASA regulations and policies. Workers in Building 103 expansion would follow OSHA standards and procedures and the project safety representative would ensure that LBP safety measures are implemented.

For these reasons, the Proposed Action would have minor LBP and asbestos effects.

Figure 4-1. Building 103 Asbestos Shingles (damaged by Hurricane Katrina)

No-Action Alternative

Under the No-Action Alternative, Building 103 expansion would not be modified or operated to conduct assembly of Ares I for the Constellation Program. Therefore, the No-Action Alternative would have no asbestos or LBP related effects.

4.8.5 Storage Tanks

Proposed Action

Operation of Building 103 expansion under the Proposed Action may involve the use of ASTs. There are no existing ASTs at the site where the expansion is planned. New ASTs may be added to the site depending on further evaluations of operational needs. No USTs will be used. Storage tank usage at the site will be conducted in accordance with all applicable regulations.

For these reasons, the Proposed Action would have a minimal impact on storage tanks.

No-Action Alternative

Under the No-Action Alternative, Building 103 expansion would not be modified or operated to conduct Ares I assembly for the Constellation Program. Therefore, the No-Action Alternative would have no effect on storage tanks.

4.9 Topography, Geology and Soils

4.9.1 Proposed Action

Modifications of Building 103 under the Proposed Action would occur entirely within the existing footprint of Building 103 and its adjoining area. The proposed modifications would not require land contouring but the expansion would involve intrusive construction activity from driving pilings. These activities would not significantly affect subsurface geological formations. Construction activities would occur within the Building 103 site, which is for the most part paved. Sediment and erosion controls would be implemented during construction to prevent any indirect impacts to surrounding soils. Such controls may include the installation of silt fences and hay bales. Operation of the High Bay would not involve any activity that would affect topography, geology, or soils in any manner.

For these reasons, the Proposed Action would have a minimal impact on topography, geology and soils.

4.9.2 No-Action Alternative

Under the No-Action Alternative, Building 103 expansion would not be modified or operated to conduct Ares I assembly for the Constellation Program. Therefore, the No-Action Alternative would have no effect on topography, geology, or soils.

4.10 Groundwater

4.10.1 Proposed Action

Modification and operation of the High Bay at Building 103 under the Proposed Action would not involve withdrawals from, or discharges to, groundwater. Construction activities are not expected to require dewatering; however, driving pilings would encounter the surficial groundwater table. This is not expected to impact either the quality or quantity of the groundwater at the site.

For these reasons, the Proposed Action would have a minimal impact on groundwater.

4.10.2 No-Action Alternative

Under the No-Action Alternative, Building 103 expansion would not be modified or operated to conduct Ares I assembly for the Constellation Program. Therefore, the No-Action Alternative would have no effect on soils.

4.11 Surface Water

4.11.1 Proposed Action

Modification of Building 103 under the Proposed Action would occur within the existing footprint of the Building and its vicinity, and as such, would have no direct impacts on the canal that runs along the perimeter of the facility. Construction activities would only result in minor soil disturbance or loss of vegetative cover. As a mitigation measure, sediment and erosion controls would be implemented during construction to prevent any indirect impacts to surrounding surface waters. Such controls may include the installation of silt fences and hay bales. Through sediment and erosion controls impacts to surface waters would be minimal.

Following construction there would be minimal increase in impervious area and consequently a minimal change in storm water runoff characteristics and volume. Operation of the High Bay under the Proposed Action would result in a very small contribution to the IWTF as described in Section 3.6.2, and would result in a minimal impact to surface water quality.

4.11.2 No-Action Alternative

Under the No-Action Alternative, Building 103 expansion would not be modified or operated to conduct Ares I assembly for the Constellation Program. Therefore, the No-Action Alternative would have no effect on surface waters.

4.12 Cumulative Impacts

4.12.1 Proposed Action

A "cumulative impact" is defined in 40 CFR 1508.7 as "the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions". Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

In 1997, the President's Council on Environmental Quality (CEQ) published guidance on assessing cumulative effects under NEPA. This guidance provided an 11 step process for conducting assessment of cumulative effects (CEQ 1997).

A key premise in assessing cumulative effects is that a proposed project must have a direct or indirect impact on a particular resource, ecosystem, or human community in order to contribute to cumulative effects. As discussed in Sections 4.1 through 4.11, the Proposed Action would not have any substantial effect on any of the resources, ecosystems, or human communities of concern. Although past actions have modified the ecosystem of the site, as well as the human environment, modifications and additions at Building 103 would have little potential to interact with any past, present, or reasonably foreseeable future actions at or outside MAF.

There are two major considerations with respect to future MAF activities when evaluating the cumulative effect of the Proposed Action. The first is the additional planned development projects identified in the MAF Master Plan. The second is the planned ramp-down of the ET processes at the site. There is currently not enough information about the total impacts from these planned actions to comprehensively evaluate cumulative impacts from the Proposed Action in light of these future actions. As noted in this document, there will be a demand for increases in utility, transportation and emergency response capacities in order to support the Proposed Action, but these are very likely to be offset by the decreasing need for this plant infrastructure as the ET ramp down progresses (Keith Savoy [NASA], 2008e).

The Proposed Action would have some minor positive cumulative impacts on the local economy resulting from increases in employment and expenditures during construction and operation. These are similarly expected to be offset by declining employment and expenditures related to the ET program.

Therefore, the cumulative impacts from the Proposed Action in combination with future planned activities at MAF are a minor impact to utilities, transportation, emergency services, and the local economy.

4.12.2 No-Action Alternative

Under the No-Action Alternative, facilities within Building 103 would not be modified and the expansion within Building 103 would not be accomplished. Modified Building 103 facilities and the high bay expansion would not be operated to conduct assembly of the Ares I for the Constellation Program.

Without the use of Building 103 expansion, MAF would support the Ares portion of the Constellation Program using less effective manufacturing methods which would increase scrap production costs while increasing technical risk to the upper stage. Therefore, the No-Action Alternative would have minor adverse cumulative impacts on operations at MAF and the mission of NASA.

5.0 Summary of Environmental Consequences and Conclusions

5.1 Summary of Environmental Consequences

The potential environmental consequences of the Proposed Action and No-Action Alternative are summarized in Table 5-1.

TABLE 5-1
Summary of Environmental Consequences
EA of Modification and Operation of Building 103 and the Expansion

Resources	Proposed Action	No Action Alternative
Air Quality	MINOR IMPACT Short-term, minor impacts from fugitive dust and construction vehicle exhaust emissions during the construction period. Fugitive dust and exhaust emissions would not collectively represent a new major source of air emission that would require modification to the MAF Title V permit. Operation of Building 103 would also not include any new source of air emission that would be regulated under an air operating permit. Fugitive dust would be controlled by BMPs.	NO EFFECT
Noise	MINOR IMPACT Temporary increase in ambient noise levels in and around construction areas during construction period. Increased noise levels would be short term and limited to normal working hours. Based on the EPA estimates of noise dissipation, construction-related noise would not be audible in the nearest residential area. Operational noise levels would be comparable to those generated by other. Operational noise would be intermittent and is expected to be below the residential acceptable range in the residential areas of Orleans Parish, Louisiana. Workers would use hearing protection and would follow OSHA standards and procedures. The project safety representative would monitor operational noise levels and would ensure that all noise protection measures are implemented during testing activities.	NO EFFECT
Cultural Resources	MINOR IMPACT Building 103 is not located within the vicinity of any of the archaeological sites that have been identified at MAF. The overall architectural design of Building 103 would be maintained. The proposed upgrades and refurbishments would improve the structural integrity of the effected parts of the building. The reuse of Building 103 to support another NASA program would add historical significance to the structure. The site is not currently on the NHPL, although additional information is being requested by the SHPO.	NO EFFECT

Regional Employment and Economic Activity	MINIMAL POSITIVE IMPACT A small number of short-term construction jobs would be accommodated by the region's existing construction workforce. Some anticipated increases in permanent jobs are expected to be offset at MAF by the ramp-down of the ET Program. Expenditures for construction-related materials and supplies would have a small, short term, beneficial effect on the economy of the region.	NO EFFECT
Public and Occupational Health and Safety	MINIMAL IMPACT The Proposed Action would require minimal permanent personnel relocations or employee hires. Workers would follow OSHA standards and procedures and the project safety representative would ensure that all safety measures are implemented during testing activities. Modifications would include upgrading/installing safety and fire detection/suppression features. MAF security program would be sufficient for providing security.	NO EFFECT
Utilities	MINIMAL IMPACT Modifications would involve upgrading existing utility systems and installing new utility systems. The increase in energy demand would not overburden the energy utility system of MAF. Proposed Action would not significantly increase potable water consumption or domestic wastewater and solid waste generation. Operation of Building 103 would produce minimal process/industrial wastewater.	NO EFFECT
Transportation	MINIMAL IMPACT Modifications would temporarily increase traffic in the area during construction. Modifications would not involve widening the facility access road. No dredging or structural modifications are needed for the MAF Dock.	NO EFFECT
Hazardous Materials Storage/Handling and Waste Management	MINIMAL IMPACT Storage/handling of hazardous materials and waste management would be conducted in accordance with local, state, and federal laws and regulations, as well as with all applicable MAF management plans and pollution prevention measures. Solid waste generated during construction activities would be disposed of at MAF's Regional Landfill.	NO EFFECT
Contaminated Areas	MINIMAL IMPACT Construction activities would not require RCRA permit coordination or an associated dig permit for utility work within the existing footprint of the building.	NO EFFECT

Asbestos and Lead–Based Paint	MINOR IMPACT LBP and asbestos management would be conducted by the EEOH Office in accordance with applicable federal, state, local, and NASA regulations and policies. Workers would follow OSHA standards and procedures and the project safety representative would ensure that the LBP and asbestos safety measures are implemented.	NO EFFECT
Storage Tanks	MINIMAL IMPACT Storage tank usage at the site would be conducted in accordance with applicable regulations.	NO EFFECT
Soils	MINIMAL IMPACT There will be some minor impact to site soils during grading and pile driving activities needed to prepare the site for construction.	NO EFFECT
Groundwater	NO IMPACT Driving pilings will encounter the surficial groundwater table. This is not expected to impact groundwater quality or quantity.	NO EFFECT
Surface Water	MINIMAL IMPACT Construction activities will result in minor soil disturbance and loss of vegetative cover, mitigated by sediment and erosion controls during construction. Post construction the small increase in impervious cover will result in a minimal increase in site runoff, and there will be a minimal increase in contribution to the IWTF as a result of processes and sanitary waste generated from the Proposed Action.	NO EFFECT
Cumulative Impacts	POSITIVE IMPACT Proposed Action would have little potential to interact with any past, present, or reasonably foreseeable future actions at or outside MAF. Coupling of the Proposed Action with planned development projects is not expected to result in adverse cumulative impacts to any resource based on locations, schedules, and respectively low direct/indirect impact potentials. Proposed Action would have some minor positive cumulative impacts on the local economy resulting from short-term, temporary increases in employment and expenditures during construction. Proposed Action would allow MAF to support the Constellation Program and manufacturing of the Ares I upper stage using more efficient and effective technologies. Therefore, it would have positive cumulative impacts on operations at MAF and the mission of NASA.	NEGATIVE IMPACT
Without the modifications to Building 103, manufacturing of the upper stage would be more complex and costly and increase the program risk. The No-Action Alternative would have adverse cumulative impacts on operations at MAF and the mission of NASA.		

5.2 Conclusions

Based on the findings of this EA, the Proposed Action would not have a significant impact on the quality of the human or natural environment. Because of the minimal impacts to the natural and human environments, mitigation measures are not proposed for the Proposed Action. This EA supports a Finding of No Significant Impact for the Proposed Action. Accordingly, preparation of a supplement to the Constellation PEIS is not required.

6.0 References

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NASA 2008b National Aeronautics and Space Administration. February 2008. *Record of Decision Constellation Programmatic Environmental Impact Statement.*

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APPENDIX A

Public Involvement